

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
16 September 2004 (16.09.2004)

PCT

(10) International Publication Number
WO 2004/079123 A1

(51) International Patent Classification⁷: E04D 3/08 (74) Agents: LYONS, Andrew, John et al.; Marks & Clerk, Tower Building, Water Street, Liverpool L3 1BA (GB).

(21) International Application Number: PCT/GB2004/000860 (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

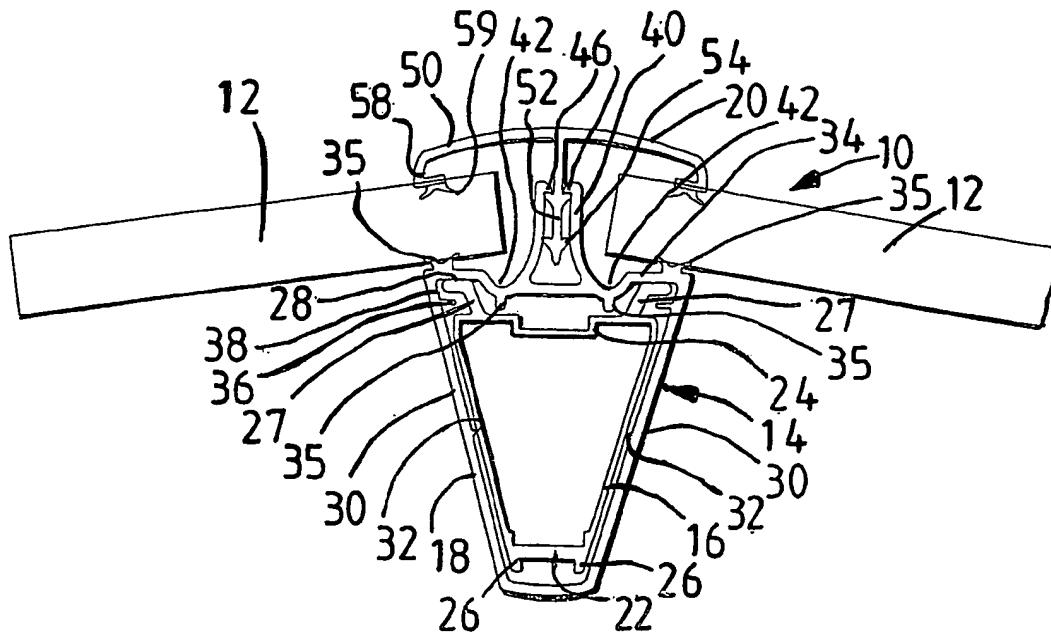
(22) International Filing Date: 1 March 2004 (01.03.2004) (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(25) Filing Language: English (71) Applicant (for all designated States except US): ULTRA-FRAME (UK) LIMITED [GB/GB]; Enterprise Works, Salthill Road, Clitheroe, Lancashire BB7 1PE (GB).

(26) Publication Language: English (72) Inventor; and (75) Inventor/Applicant (for US only): RICHARDSON, Christopher [GB/GB]; 9 Gleneagle Drive, Brockhall Village, Old Langho, Clitheroe, Lancashire BB6 8BF (GB).

[Continued on next page]

(54) Title: ROOF BEAMS



WO 2004/079123 A1

(57) Abstract: A roof beam (14) for a conservatory roof (10) comprises a core profile (16) of metal, a plastics member (18) fitted to the core profile and providing at least one ledge for carrying an edge of a sheet of glazing material (12) and a cap (20) mountable on the plastics member for retaining the glazing sheet thereon.



Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Title: Roof beams

Description

This invention concerns roof beams and in particular concerns roof beams for use in constructing conservatories and like structures having roofs comprising panels usually of translucent material supported between roof beams.

Translucent panels for conservatory roofs are generally sandwiched at their edges between upper and lower roof beam forming extrusions or caps coupled to a glazing bar, usually of aluminium. The roof beams are usually mounted between a ridge beam and an eaves beam. To provide a good seal above and below the translucent panels, provisions are made for the roof beam to retain gaskets in suitable positions.

Upper roof beam forming extrusions or caps may have gaskets formed integrally with panel contacting edges thereof and gaskets for the underside of the panels are usually retained in special formations of the aluminium glazing bars. These gaskets have to be fitted to the extrusions on site, which takes up time. Also, the extrusions are more expensive to produce because of the additional gasket retaining formations required.

Furthermore, in order to retain the lower beam forming caps, the aluminium glazing bars require further formations on which the lower beam caps can locate.

In GB 2275958A it was proposed to provide a roof beam construction for use in constructing conservatory roofs comprising a glazing bar generally in the form of an inverted T, in use, and upper and lower caps therefor having gaskets

formed integrally on edges thereof between which a roofing panel is to be retained and means for locating the caps on said glazing bar, wherein the means for locating the lower capping on the glazing bar comprises the integrally formed gaskets, which in use are trapped between the glazing bar and roofing panel.

Because the glazing bar is aluminium and extends upwards between adjacent translucent panels, there exists the possibility of cold transference from the outside through into the conservatory with the formation of condensation occurring on inner surfaces of the conservatory roof.

An object of this invention is to provide an improved roof beam for use in constructing conservatory roofs and the like.

According to the present invention there is provided a roof beam for use in constructing conservatory roofs comprising a core profile of metal, a plastics member fitted to the core profile and providing at least one ledge for carrying an edge of a sheet of glazing material and a cap mountable on the plastics member for retaining the glazing sheet thereon.

In a first preferred embodiment the core profile is a hollow extrusion and the plastics member is a sheath for the core profile. In another preferred embodiment, the plastics member is mountable on top of the core profile. For example, the plastics member may be a sliding fit or a snap fit on the top of the core profile. Reinforcement may be provided internally of the core profile, such as in the form of steel profiles inserted into the core profile. Such reinforcement is mainly intended for use with core profile lengths over a predetermined threshold for additional strength. The core profile and or the sheath are preferably shaped to reduce direct contact between them. For example, the sheath may have on its inner spaced surface ribs or the like to provide the only lines of contact with the

core profile in certain regions. Additionally or alternatively, the core profile bar can have spaced feet or flanges that make end contact with the sheath.

A preferred sectional profile for the core profiles used in the invention is that of a trapezium having a narrow base and wider top. The sheath preferably has a corresponding profile.

The plastics member, such as the sheath, preferably has a pair of ledges one each side of a connection formation for attachment of the cap. The ledges preferably have gasket material, such as of rubber or other suitable elastomeric material, thereon for sealing against the underside of glazing material. The gasket material may be fitted in grooves or the like in the ledges or may be bonded to or co-extruded onto the ledges. Between the ledges and the connection formation, the sheath preferably has longitudinal channels to provide drainage passages in case of water penetration through the roof beam.

The connection formation of the plastics member, such as the sheath, is preferably in the form of a slot whose sides extend upwardly from the top of the sheath. The sides end with internal lips, whose top surfaces are preferably chamfered for ease of entry of a connection formation of the cap. The cap preferably has an, in use, depending connection formation having at least one pair and preferably two pairs of ribs thereon that can be pushed into the slot of the plastics member and retained there with glazing material sandwiched between the cap and the ledges of the plastics member. Two pairs of ribs are preferably provided on the cap connection formation, so as to allow the cap to be fitted at two different heights relative to the plastics member to accommodate glazing materials of different thickness. Alternatively, the cap may have a single pair of ribs and the

slot of the plastics member may have two pairs of internal barbs or the like to allow the cap to be fitted over two different thicknesses of glazing material.

The cap is preferably generally of T-section, the stem of the T providing the connection formation. The cross bar of the T-section preferably has gasket material at ends thereof, such as of rubber or other suitable elastomeric material, for sealing against the topside of glazing material. The gasket material may be fitted in grooves or the like in the ends of the cap crossbar or may be bonded to or co-extruded onto the ends thereof. The cross bar of the cap is preferably arcuate and ends thereof preferably depend to meet the glazing material.

Roof beams according to the invention may be mounted between a ridge beam and eaves beam by any suitable means, although it is to be noted that the preferred hollow nature of the core profile allows for fitting of roof beam connectors that can cooperate with formations of a ridge and/or eaves beam for ease of fitting. Preferably such connectors permit snap fitting with cooperating formations of ridge and/or eaves beams.

According to the invention it is further proposed that anti-theft means be provided for roof beams having a cap for holding down glazing panels on the roof beam. Where the cap has a stem locatable in a slot or channel of a roof beam component said means is preferably a clip or the like that can be positioned on the end of the cap to mask the slot or channel from insertion of a lifting tool. The clip or the like is preferably generally U-shaped to fit either side of the slot or channel. Internally of the clip one or more barbs may be provided for gripping the outer sides of the slot or channel or for locating in depression or holes provided in the sides of the slot or channel. The clip preferably has flared ends to facilitate fitting thereof. The clip preferably also has a pair of lugs that extend from the closed end of the

clip to overlie the top edges of the slot or channel sides, in order to prevent insertion of a lifting tool.

This invention will now be further described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is and end view of part of a Victorian style conservatory roof using a roof beam according to the invention;

Figure 2 is a perspective view of the transom part of the roof of Figure 1;

Figure 3 is and end view of part of a Georgian style conservatory roof using a roof beam according to the invention;

Figure 4 is a perspective view of the part roof of Figure 3;

Figure 5 shows a roof beam with security clip; and

Figure 6 shows the security clip.

Referring to Figures 1 and 2 of the accompanying drawings, a conservatory roof 10 comprises glazing panels 12 mounted between roof beams 14. The roof shown is part of a so-called Victorian roof with Figure 1 illustrating the roof beam used at the roof end and Figure 2 the transom part of the roof.

A roof beam 14 comprises a core profile 16 in the form of a hollow section extrusion 16 from aluminium, an extruded plastics sheath 18 fitted over the core profile and a cap 20 mounted on the sheath and trapping edges of the glazing panels between the sheath and the cap. The core profile is a trapezium in section having a narrower base 22 than top 24. The base has along opposite edges ribs 26 that act as feet for the base and provide minimal contact between the base and the sheath in that region. The top 24 of the core profile has a pair of flanges 27 extending upwardly and outwardly therefrom that provide surfaces 28 that contact the inside surface of the sheath.

The sheath has a corresponding sectional profile to that of the core profile. Its side walls 30 each have a longitudinal rib 32 that serves to space the core profile from the sheath to minimise contact between them. Similarly, the top wall 34 of the sheath has depending ribs again that space the top wall of the core profile from the inside surface of the sheath top wall. Within its top corners the sheath has a pair of ledges 36 that form channels 38 to locate the flanges 26 of the core profile.

The top wall 34 of the sheath has near its side edges gasket material 35 of rubber or other suitable elastomeric material co-extruded or bonded thereon for sealing against the underside of glazing panels mounted on the roof beam. Centrally of the top wall 34 of the sheath is an upstanding connection formation 40 for attachment of the cap to the sheath. Either side of the formation 40 is a groove 42 providing a drainage passage for any water or condensation that may collect on the sheath.

The connection formation 40 is in the form of a slot having a relatively narrow opening between lips 46 at the top ends of the slot sides 48. The cap 20 is generally T-shaped in section and has an arcuate top 50 and a depending limb 52 that has two pairs of barbs 54 on opposite sides thereof. The barbs are shaped so as to pass relatively easily into the slot 40 but to be difficult to remove therefrom. Two pairs of barbs are provided to allow the cap to accommodate two different thicknesses of glazing panel. The cap top has its ends 58 turned downwards and gasket material 59 of rubber or other suitable elastomeric material co-extruded or bonded onto the ends 58 for sealing against the top surfaces of the glazing panels. Because the cap is extruded of plastics material it has some inherent resilience, so that when pushed down onto the sheath and located thereon, the positioning of the

barbs will enable the cap ends to exert holding and sealing pressure on the glazing panels.

It is envisaged that the roof beams 12 may be mounted between a ridge beam and eaves beam by any suitable means, although it is to be noted that the hollow nature of the core profile allows for fitting of roof beam connectors that can cooperate with formations of a ridge and/or eaves beam for ease of fitting. Preferably such connectors permit snap fitting with cooperating formations of ridge and/or eaves beams.

It is to be noted that the angle of the sides of the roof beam of Figures 1 and 2 to the vertical when in position can be chosen to correspond with the pitch of the roof being constructed. That has the advantage that in forming a roof with jack rafters, the jack rafters are able to abut the main roof beams without any overhang visible from below.

In a Victorian style conservatory, the roof beams for the transom situation and for the Victorian roof end can be the same. However, for a Georgian style conservatory roof, in which the roof end is square and the angle of adjacent glazing panels at the corners is greater than the angle of adjacent panels forming a Victorian roof end, it is necessary to have a slightly different roof beam than that illustrated in Figures 1 and 2 of the drawings. Such a roof beam is shown in Figures 3 and 4 of the drawings, in which like parts to those in Figures 1 and 2 have been given the same number for ease of reference. In fact, the only difference between the Victorian and Georgian embodiments is the shape of the cap referred to in Figures 3 and 4 as 20A.

The top of the cap 20A has deeper ends 58A than the cap 20 to accommodate the steeper angle of the glazing panels compared to those in the transom/Victorian situations.

In this embodiment there is also shown the inclusion of steel reinforcement 60 for the aluminium core profile that may be needed for longer lengths of core profile. The reinforcement may be used in the embodiment of Figures 1 and 2 also.

In Figure 3 there are shown whisper gaskets 62 of rubber or other elastomeric material that can be provided on the outside of connection formation 40 for providing an additional thermal seal against ends of the glazing panels 12. An alternative to the whisper gaskets may a longitudinal resilient bead or bubble on either side of the formation 40.

Finally Figures 5 and 6 of the drawings show security arrangements for a roof beam of the type described above. It is envisaged that glazing panels can be removed from a conservatory roof by prising off the roof beam caps 20 at the eaves beam end. To prevent that a clip 70 can be fitted to the end of the sheath 18 over the slot formation 40 to mask the slot, so that a lifting tool cannot be inserted to prise off the cap 20.

The clip 70 has a U-shaped body forming a closed end 72 and sides 74. The free ends 75 of the sides 74 are flared to facilitate fitting of the clip. The closed end of the clip has a pair of inverted L-shaped lugs 78 extending therefrom that when fitted overlie the top edges of the sides of the slot 40 of the sheath 18. The sides 74 of the clip have internal barbs 76 that grip the sides of the slot formation 40 or locate in depressions or holes thereof to make it difficult to pull the clip off the end of the sheath 18. With the clip in place there is no access for a lifting tool, such

as a screwdriver, to be inserted between the cap and the sheath for prising off the cap.

Claims:

1. A roof beam for a conservatory roof, wherein the roof beam comprises a core profile of metal, a plastics member fitted to the core profile and providing at least one ledge for carrying an edge of a sheet of glazing material and a cap mountable on the plastics member for retaining the glazing sheet thereon.
2. A roof beam as claimed in claim 1, wherein the core profile is a hollow extrusion and the plastics member is a sheath for the core profile.
3. A roof beam as claimed in claim 1 or 2, wherein the plastics member is mountable on top of the core profile.
4. A roof beam as claimed in claim 3, wherein the plastics member is a sliding fit or a snap fit on the top of the core profile.
5. A roof beam as claimed in any one of claims 1 to 4, wherein reinforcement is provided internally of the core profile.
6. A roof beam as claimed in claim 5, wherein the reinforcement is in the form of steel profiles inserted into the core profile.
7. A roof beam as claimed in any one of claims 1 to 6, wherein either or both of the core profile and the sheath are shaped to reduce direct contact between them.
8. A roof beam as claimed in claim 7, wherein the sheath has on its inner spaced surface ribs or the like to provide the only lines of contact with the core profile in certain regions.
9. A roof beam as claimed in claim 7 or 8, wherein additionally or alternatively, the core profile bar has spaced feet or flanges that make end contact with the sheath.

10. A roof beam as claimed in any one of claims 1 to 9, wherein the core profile has a sectional profile of a trapezium having a narrow base and wider top.
11. A roof beam as claimed in claim 10, wherein the sheath has a corresponding profile to that of the core profile.
12. A roof beam as claimed in any one of claims 1 to 11, wherein the plastics member has a pair of ledges, one each side of a connection formation for attachment of the cap.
13. A roof beam as claimed in claim 12, wherein holes for the internal projections of the end cap are provided in the ledges.
14. A roof beam as claimed in claim 12 or 13, wherein the ledges have gasket material thereon for sealing against the underside of glazing material.
15. A roof beam as claimed in claim 14, wherein the gasket material is of rubber or other suitable elastomeric material.
16. A roof beam as claimed in 14 or 15, wherein the gasket material is fitted in grooves or the like in the ledges or bonded to or co-extruded onto the ledges.
17. A roof beam as claimed in any one of claims 12 to 16, wherein between the ledges and the connection formation, the sheath has longitudinal channels to provide drainage passages in case of water penetration through the roof beam.
18. A roof beam as claimed in any one of claims 12 to 17, wherein the connection formation of the plastics member is in the form of a slot whose sides extend upwardly from the top of the sheath.
19. A roof beam as claimed in claim 18, wherein the sides end with internal lips, whose top surfaces are chamfered for ease of entry of a connection formation of the cap.

20. A roof beam as claimed in claim 19, wherein the cap has an, in use, depending connection formation having at least one pair of ribs thereon that can be pushed into the slot of the plastics member and retained there with glazing material sandwiched between the cap and the ledges of the plastics member.
21. A roof beam as claimed in claim 20, wherein two pairs of ribs are provided on the cap connection formation, so as to allow the cap to be fitted at two different heights relative to the plastics member to accommodate glazing materials of different thickness.
22. A roof beam as claimed in claim 20, wherein the cap has a single pair of ribs and the slot of the plastics member has two pairs of internal barbs or the like to allow the cap to be fitted over two different thicknesses of glazing material.
23. A roof beam as claimed in any one of claims 1 to 22, wherein the cap is generally of T-section, the stem of the T providing the connection formation.
24. A roof beam as claimed in claim 23, wherein the cross bar of the T-section has gasket material at ends thereof for sealing against the topside of glazing material.
25. A roof beam as claimed in claim 24, wherein the gasket material is of rubber or other suitable elastomeric material.
26. A roof beam as claimed in claim 24 or 25, wherein the gasket material is fitted in grooves or the like in the ends of the cap crossbar or bonded to or co-extruded onto the ends thereof.
27. A roof beam as claimed in any one of claims 1 to 26, wherein the cross bar of the cap is arcuate and ends thereof depend to meet the glazing material.
28. A roof beam as claimed in any one of claims 1 to 27 having anti-theft means.

29. A roof beam as claimed in claim 28, wherein said anti-theft means is a clip or the like that can be positioned on the end of the cap to mask the slot or channel from insertion of a lifting tool.
30. A roof beam as claimed in claim 29, wherein the clip or the like is generally U-shaped to fit either side of the slot or channel.
31. A roof beam as claimed in claim 30, wherein internally of the clip one or more barbs are provided for gripping the outer sides of the slot or channel or for locating in depression or holes provided in the sides of the slot or channel.
32. A roof beam as claimed in claim 29, 30 or 31, wherein the clip has flared ends to facilitate fitting thereof.
33. A roof beam as claimed in any one of claims 29 to 32, wherein the clip has a pair of lugs that extend from the closed end of the clip to overlie the top edges of the slot or channel sides, in order to prevent insertion of a lifting tool.
34. A roof beam substantially as hereinbefore described with reference to and as illustrated in any of the accompanying drawings.
35. A conservatory roof including a roof beam as claimed in any one of claims 1 to 36.

114

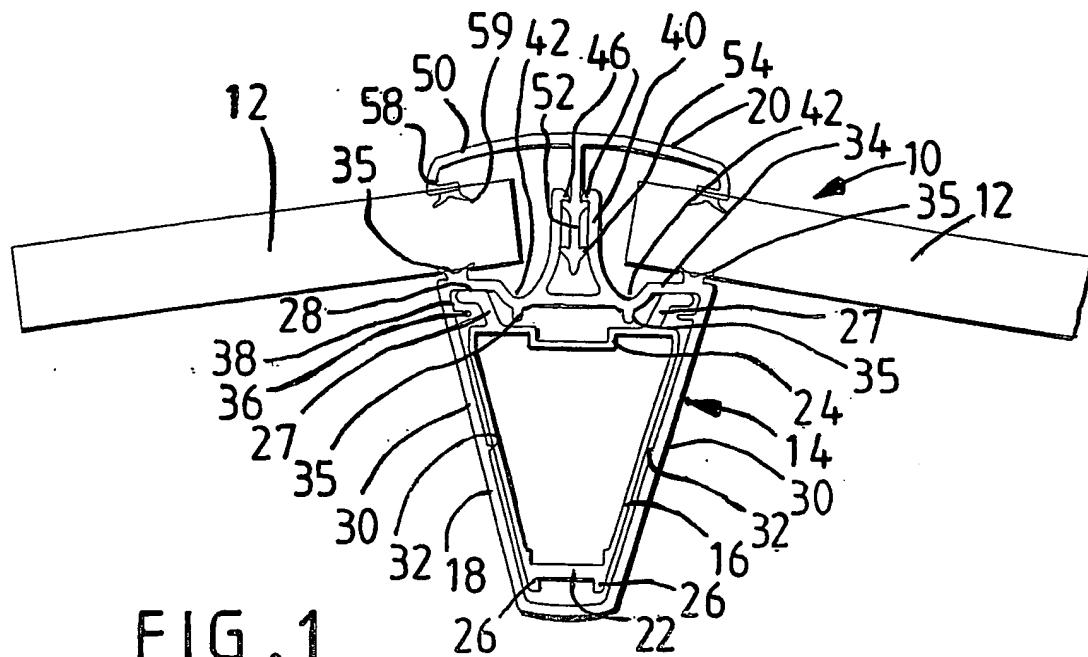


FIG. 1

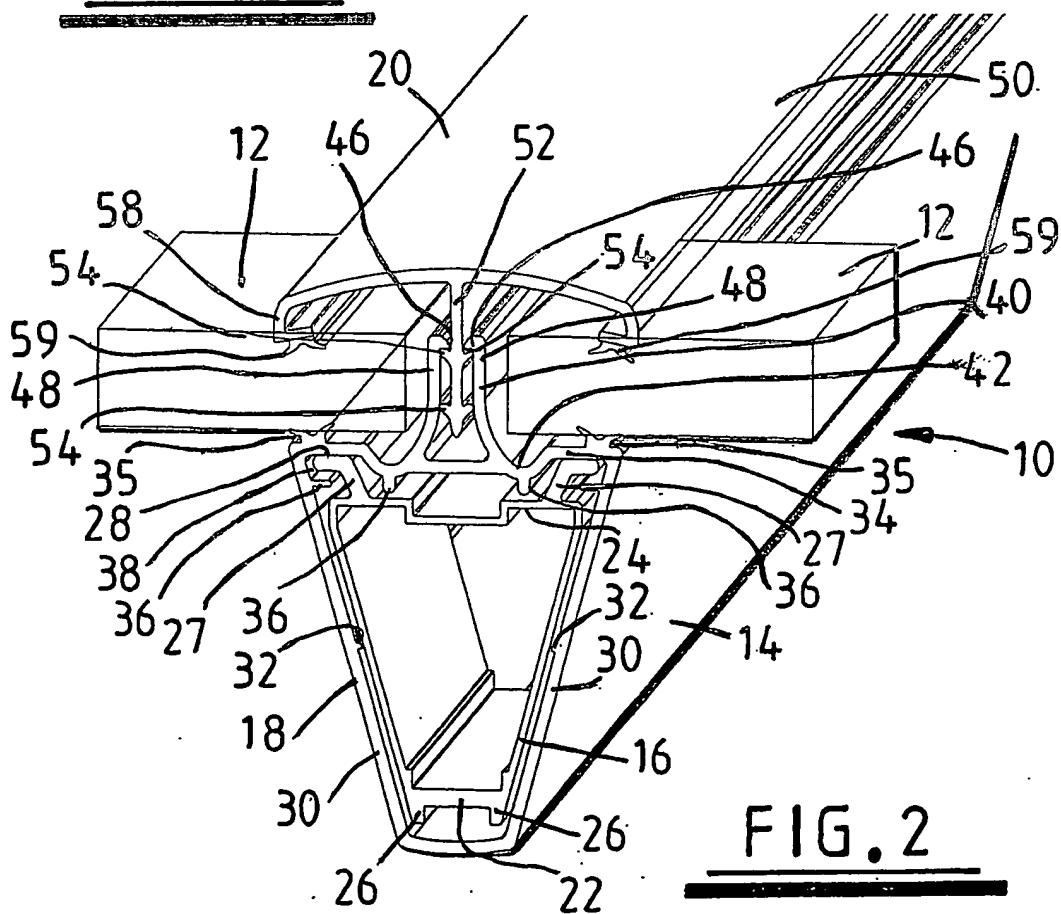
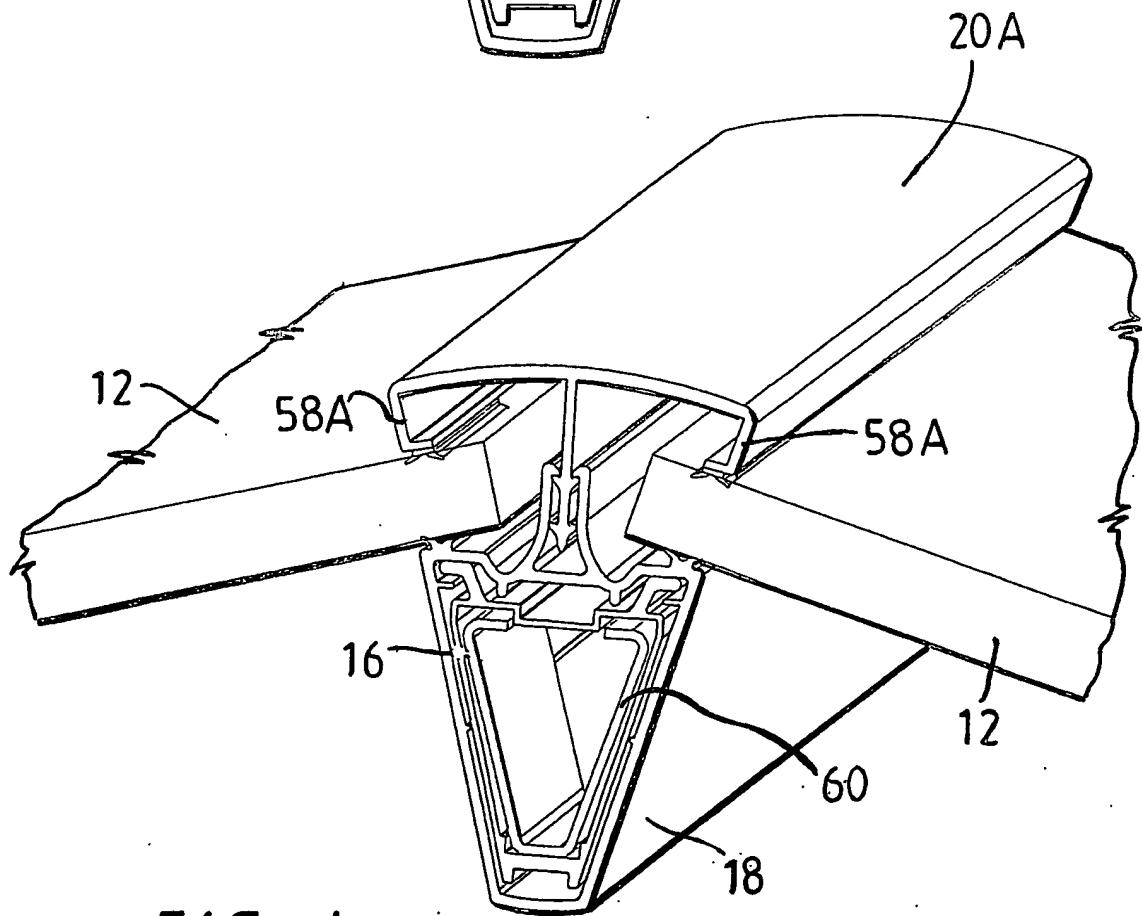
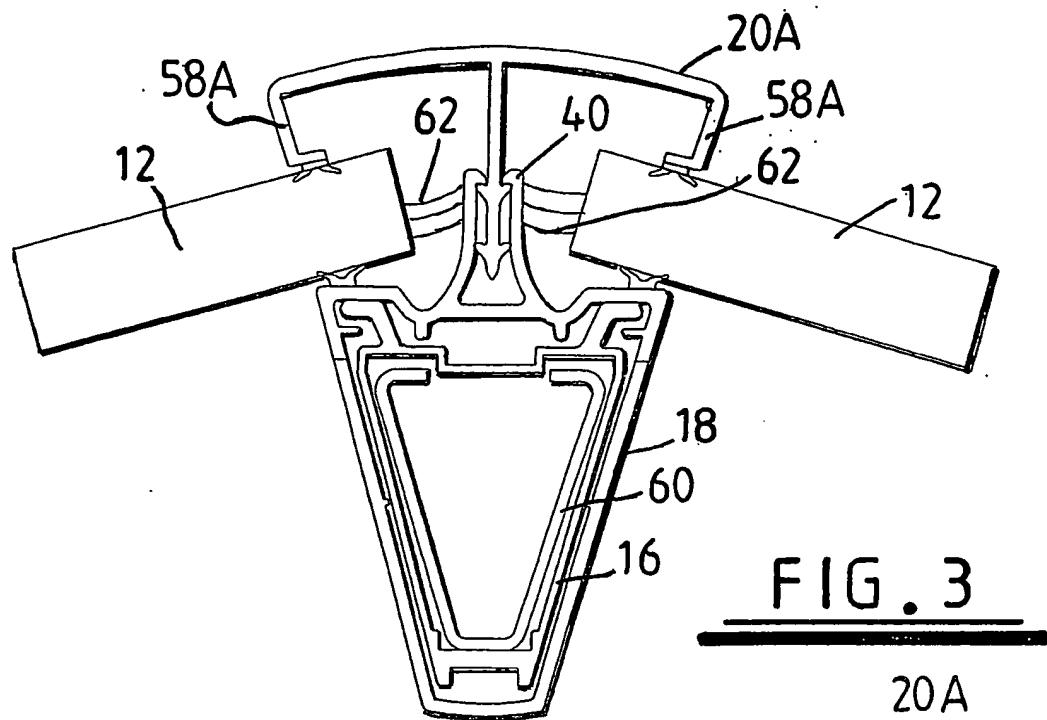
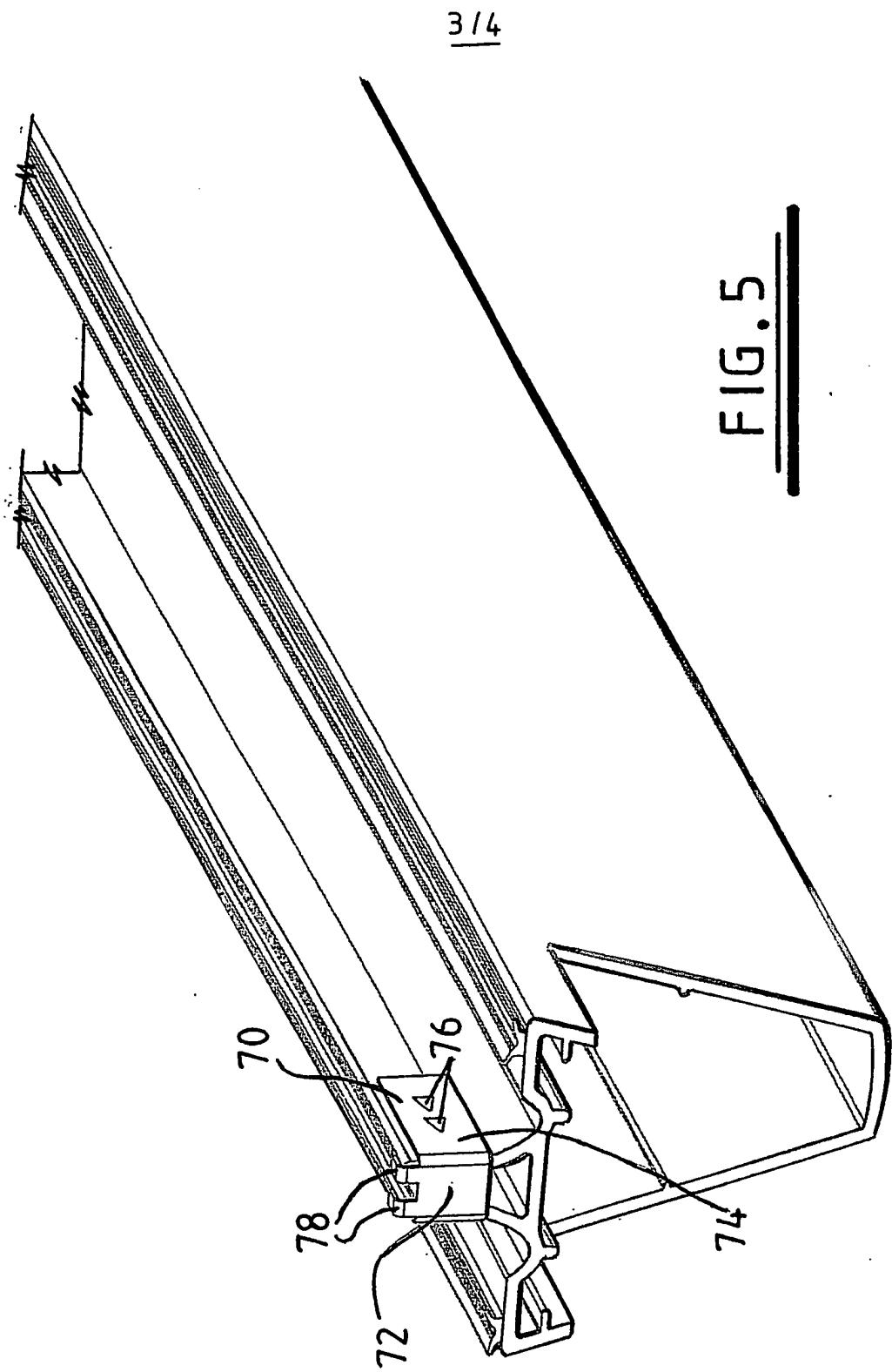
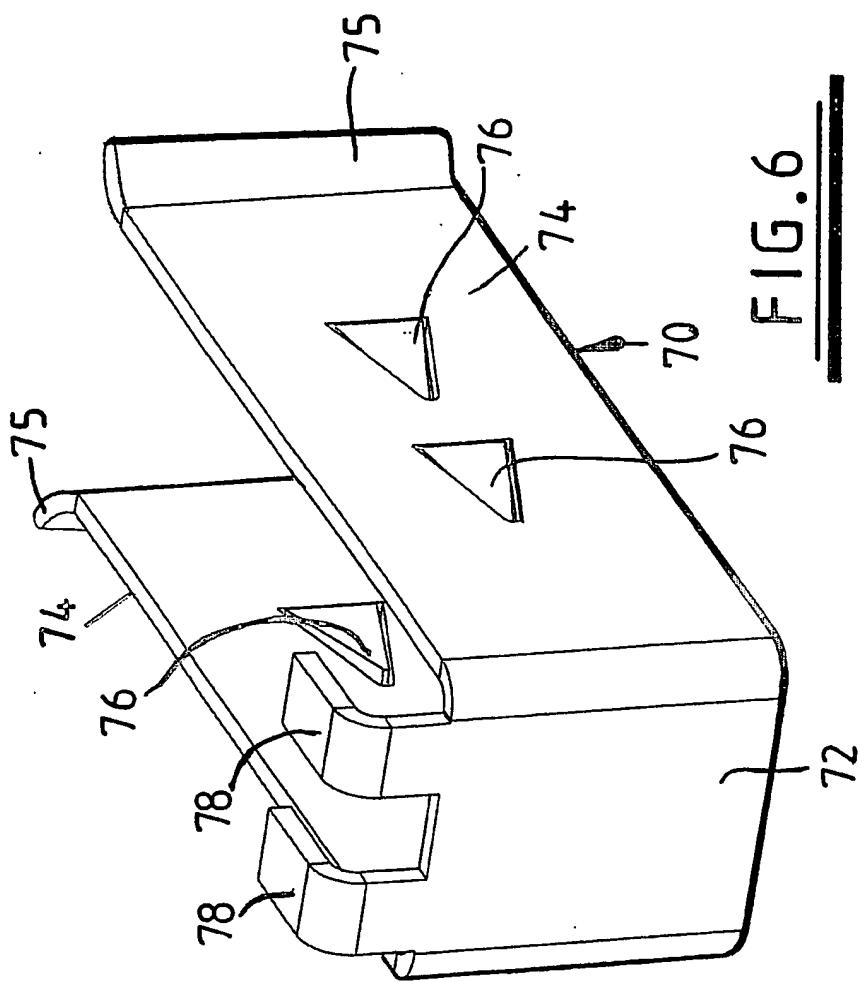


FIG. 2

2/4



4/4FIG. 6

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E04D3/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E04D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 092 078 A (GEBHARDT MANFRED ;HOFF FRANZ CLEMENS (DE)) 26 October 1983 (1983-10-26) abstract; claims 1-3; figures 2-6 page 5, last paragraph -page 7, paragraph 1	1-4, 7-10, 12-17 11
X	BE 1 005 690 A (BOM P L J BEHEER BV) 14 December 1993 (1993-12-14) page 2, paragraph 1; figures 3-7	1-4,12, 17 11, 14-16, 18-27
Y	page 3, line 2 - line 3 page 3, line 27 - line 28	
Y	GB 2 304 365 A (LEACH BRIAN ;JONES DAVID MELVILLE (GB)) 19 March 1997 (1997-03-19) figure 3	14-16, 18-27
	---	-/-

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the International filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the International filing date but later than the priority date claimed

- *T* later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 June 2004	29/06/2004
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Demeester, J

INTERNATIONAL SEARCH REPORT

BEST AVAILABLE COPY

International Application No

PCT/GB2004/000860

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 616 092 A (THYSSEN POLYMER GMBH) 21 September 1994 (1994-09-21) column 1, line 47 -column 2, line 29; figure 2	1-4, 7, 8, 12-17 5, 6, 28, 29
Y	FR 2 655 676 A (JACQUEMIN GUILLAUME DANIEL) 14 June 1991 (1991-06-14) page 4, line 31 -page 5, line 7; figures 2, 3	5, 6, 28, 29
A	GB 1 077 733 A (SMITH & PEARSON LTD; ARTHUR IRWIN PEARSON) 2 August 1967 (1967-08-02) figure 4	30, 31

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB2004/000860

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
EP 0092078	A	26-10-1983	DE AT DE EP	3213981 A1 25273 T 3369543 D1 0092078 A2		03-11-1983 15-02-1987 05-03-1987 26-10-1983
BE 1005690	A	14-12-1993	BE EP NL NL	1005690 A3 0513934 A1 9201004 A 9300298 A		14-12-1993 19-11-1992 02-11-1992 16-09-1993
GB 2304365	A	19-03-1997		NONE		
EP 0616092	A	21-09-1994	DE AT CZ DE EP PL	9303883 U1 197726 T 9400585 A3 59409591 D1 0616092 A1 176928 B1		19-05-1993 15-12-2000 19-10-1994 28-12-2000 21-09-1994 31-08-1999
FR 2655676	A	14-06-1991	FR	2655676 A1		14-06-1991
GB 1077733	A	02-08-1967		NONE		